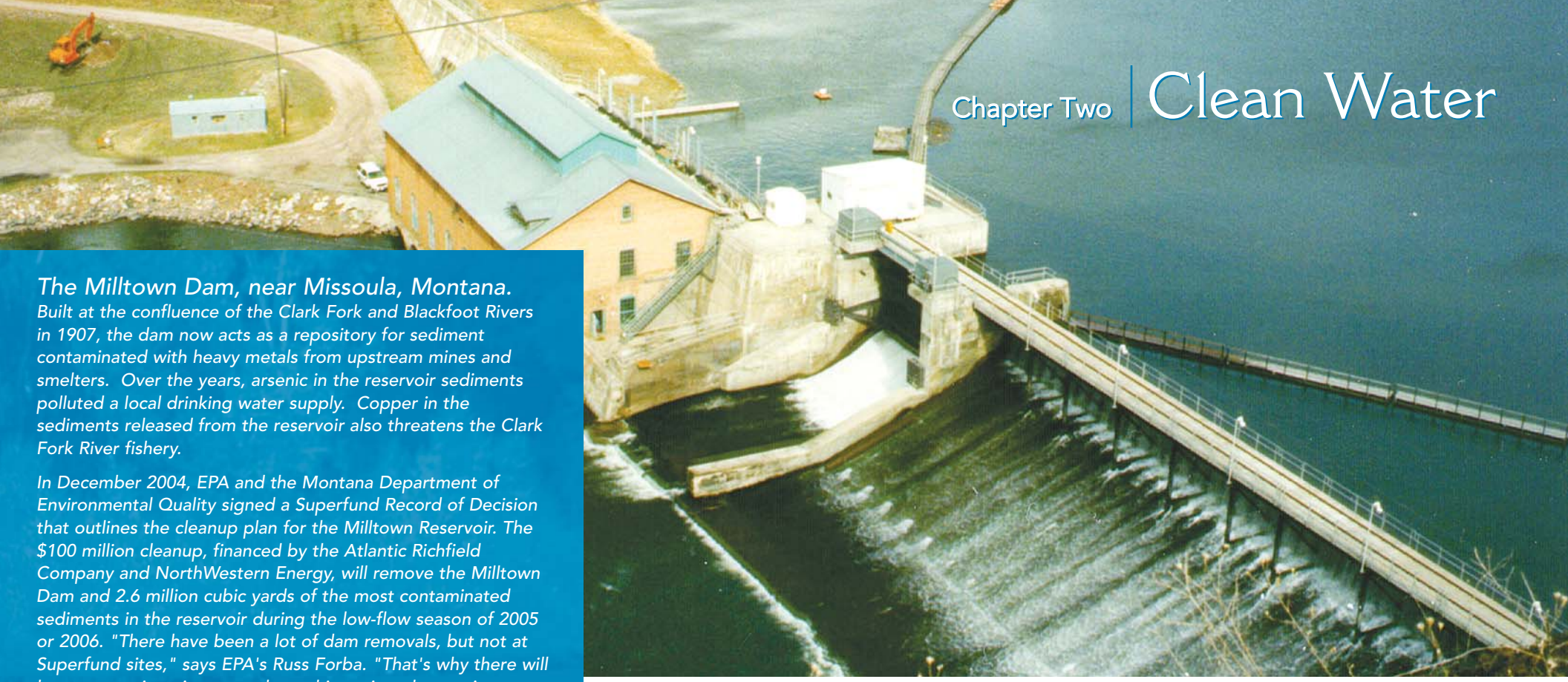
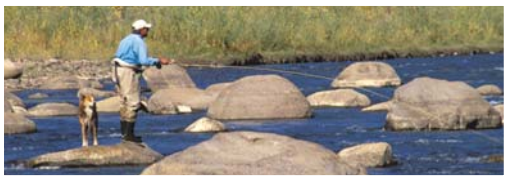


# Chapter Two | Clean Water

*The Milltown Dam, near Missoula, Montana.*
*Built at the confluence of the Clark Fork and Blackfoot Rivers in 1907, the dam now acts as a repository for sediment contaminated with heavy metals from upstream mines and smelters. Over the years, arsenic in the reservoir sediments polluted a local drinking water supply. Copper in the sediments released from the reservoir also threatens the Clark Fork River fishery.*

*In December 2004, EPA and the Montana Department of Environmental Quality signed a Superfund Record of Decision that outlines the cleanup plan for the Milltown Reservoir. The $100 million cleanup, financed by the Atlantic Richfield Company and NorthWestern Energy, will remove the Milltown Dam and 2.6 million cubic yards of the most contaminated sediments in the reservoir during the low-flow season of 2005 or 2006. "There have been a lot of dam removals, but not at Superfund sites," says EPA's Russ Forba. "That's why there will be more engineering controls on this project than on just about any other we've done."*

*EPA continues to address environmental issues throughout the Clark Fork basin through Superfund, watershed grants and other programs. EPA signed a Superfund Record of Decision in April 2004 for sections upstream of the Milltown Dam, outlining cleanup plans for 120 miles of the Clark Fork River from Warm Springs Ponds to the dam. In 2003, EPA awarded a $1 million watershed grant to a coalition of local partners that will finance dozens of projects through 2005. These projects focus on improving water quality and habitat on tributaries, the mainstem of the Clark Fork River and Lake Pend Oreille in Montana and Idaho.*



## Introduction

As the headwaters for major river systems that provide water for 27 states, the Rocky Mountains in Region 8 serve as a major source of water. The Colorado, Missouri, Platte, Rio Grande, Arkansas and Yellowstone Rivers are among the most notable of these waterways, which give life to Western landscapes. Free-flowing, dammed into reservoirs, pumped and diverted, and held in underground aquifers, this water does a lot of work. It supplies millions of people with drinking water, grows crops and feeds cattle, supports plants and fish and sustains vibrant recreational economies. With each passing year, the demands that we place on this limited resource increase, intensifying the competition between uses and placing a premium on the availability of clean water.

Region 8 works with state and tribal partners to protect surface and groundwater quality through a variety of programs established under the Clean Water Act and other laws. Some provide grants to help states monitor lakes and rivers and develop plans to clean up impaired waters. Others support local watershed-based efforts, providing communities with expertise and resources to address key issues. Still other programs help protect groundwater, including aquifers and potential drinking-water sources.

Photos: South Dakota DENR

*No-till fields (left) and stream bank stabilization (right) are key pollution reduction measures being successfully employed in the Big Sioux watershed in South Dakota. EPA's support of state and local efforts in the watershed is achieving significant reductions in sediment and phosphorous pollution.*

## Addressing nonpoint sources of pollution

Among the most challenging sources of water pollution are "nonpoint sources" — pollution from widespread, difficult-to-manage places such as runoff from farmland and urban areas. This pollution, whether in the form of nutrients such as phosphorous and nitrogen, sediment, oil, chemicals or other pollutants, is responsible for more than half of the impaired lakes and rivers in Region 8.

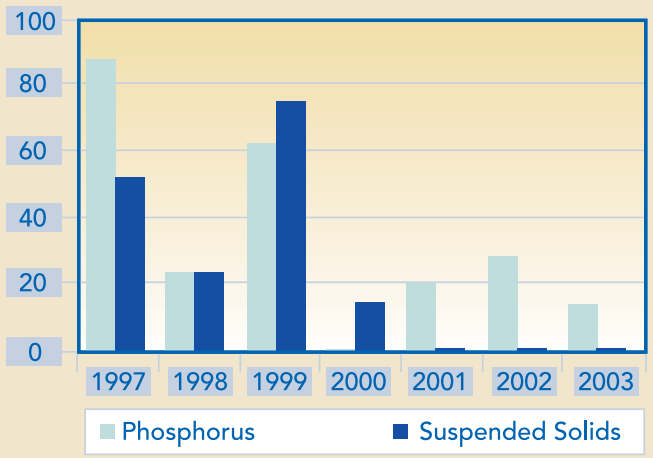
EPA's Nonpoint Source program supports local efforts to develop and implement management practices that reduce pollution from these sources. In Region 8, EPA has invested $104 million in more than 1,100 nonpoint source control projects since 1989. Many have achieved dramatic results.

EPA is involved in a big water quality success in Chalk Creek, a tributary in Utah's Weber River watershed. Chalk Creek provides part of Ogden's drinking water and is home to a pure strain of native Bonneville cutthroat trout.

Fifteen years ago, Chalk Creek had serious pollution problems with high levels of phosphorus and sediments from dozens of farms in the watershed. Since then, nearly 100 landowners have worked with EPA and other federal, state and local partners to control pollution and implement restoration projects. Voluntary cooperation has improved 84,000 acres, more than half the drainage, over the last decade.

Collectively, these actions have reduced concentrations of total phosphorus in Chalk Creek by 20 percent. This impressive result was accomplished through actions taken to reduce the erosion of sediments into the creek, including stabilizing stream banks, restoring streamside vegetation and improving rangeland cover to reduce runoff. Today willows and cottonwoods thrive along the creek, providing shade shelter for trout, trapping sediments and preventing runoff from reaching the water. Water quality improvement is expected to continue as these projects mature — good news for Chalk Creek and the fish that need oxygen and high quality water to survive.

**Percentage of Samples in Chalk Creek Exceeding Standards for Phosphorous and Suspended Solids**




Graph: Utah DEQ

*The Bonneville cutthroat trout. This pure strain of native trout is benefiting from pollution reductions in Chalk Creek, Utah.*

Photo: National Park Service

## Collaborating to manage animal feedlots

Over the past decade, the emergence of large livestock operations has been a big trend in agriculture. These feedlots — which can hold thousands of cattle, dairy cows, hogs, chickens, turkeys and other animals — generate manure, litter and wastewater that contain pollutants such as nitrogen, phosphorous, solids, metals and bacteria. Many produce more wastewater than large cities, which, when poorly managed, can enter local waters from spills or breaks of storage structures, from surface streams and runoff and the application of excess manure to crop land.

With more than 750 of these large, concentrated animal feedlot operations (called CAFOs), EPA Region 8 has been a

Photo: Utah DEQ

*In Utah, the effort to address pollution from CAFOs has focused on maintaining the viability of livestock production. Here, producers are helping other producers find solutions that work. Jon Beck is one of them. For many years, runoff from Jon's feed yard drained directly into the Spanish Fork River. After members of the Utah Animal Feedlot Operations team told him about USDA programs that would help pay for pollution-reduction measures, Jon moved the feed yard and constructed a berm along 225 feet of river to prevent runoff from reaching the river (photo above shows berm on the left and the relocated feedlot). "I didn't want to admit it, but I was polluting the waterways," says Jon. "This program came out and I thought I'd might as well take advantage of it and make sure it's done right."*

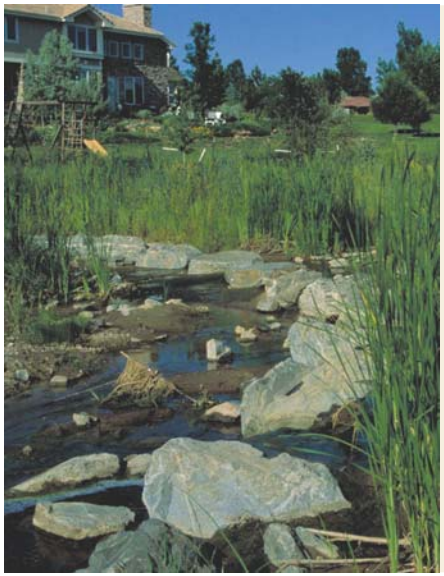


Photo: AMEC Earth and Environmental, Inc.

*A restored streambed with wetlands at the Preserves development in Greenwood Village, Colorado.*

leader in developing a national strategy to address their impacts. EPA began working in the late 1990s with the U.S. Department of Agriculture, state environment and agriculture agencies and producer groups to revise Clean Water Act regulations to manage animal waste. The strategy included three years of consultation with producer groups to develop rules that made economic and environmental sense.

EPA issued the CAFO regulations in 2003, and Region 8 is now helping states inventory CAFOs and establish permit programs that address design and waste management issues for production areas and land application activities, such as applying waste to fertilize crops. In addition to permits, all CAFOs are required to have a Nutrient Management Plan in place by the end of 2006. These NMPs outline how each operation will safely manage and dispose of the solid and liquid waste its animals generate.

Over the past two years, Region 8 and state agencies have been working on the ground with producers to help them manage animal waste. More than 350 CAFOs have been permitted, and most of the remaining permits will be issued by 2006. These permits provide for site and equipment inspections, proper waste containment, identification of setback requirements for land application areas, manure and soil samples, spill records and an annual report.

The results have been good for the environment and good for producers. By taking advantage of resources and support provided by USDA Farm Bill programs, EPA and state agencies, livestock owners are relocating livestock areas, installing fences along streams, building wastewater lagoons and drainage pipes, installing waste digesters and taking other measures to keep pollution out of rivers and streams.

Nationally, the new CAFO regulations are protecting rivers and lakes by reducing nutrients such as phosphorous and nitrogen, elevated organic matter and pathogens that harm aquatic life, livestock and drinking water supplies. When fully implemented, the regulations will reduce phosphorus released into the environment by 56 million pounds nationally each year, and nitrogen releases by more than 100 million pounds.

## Managing growth and water quality in an urban watershed

In many areas in Region 8, especially in rapidly growing areas along Colorado's Front Range and Utah's Wasatch Front, EPA is helping local interests manage water-quality impacts associated with growth.

Urbanization can be a water-quality concern because replacing open space and natural areas with buildings, parking lots, streets and sidewalks introduces new pollution sources and increases "impervious" surface area. This reduces the natural infiltration of water into groundwater, leading to increased storm-water runoff and pollution loads to nearby streams and rivers.

In 1999, the Cherry Creek Stewardship Partners formed to find solutions to water-quality problems in the rapidly growing Cherry Creek watershed (parts of Denver and Arapahoe and Douglas counties). The Partners started with a basin-wide conference and have been building a growing coalition of local governments, land-use planners, private developers, contractors and resource protection advocates ever since.

One result of this collaboration is the Smart Growth for Clean Water project, one of five national EPA pilots selected in 2003 to demonstrate innovative growth-management approaches that protect water resources. This project emphasizes concepts such as enhancing and creating key wetland areas; using land conservation and building setbacks to maintain urban wildlife corridors; developing grass swales and porous landscape detention ponds to capture polluted runoff and control flooding; clustering new development to optimize open space and absorb runoff; and restoring streams to shallow channels with wide floodplains.

The Partners' ability to provide outreach has been critical to success. Arapahoe County Engineer, Lanae Raymond, explains, "The Partners have committed to 'leave no developer behind' in the smart growth for clean water effort. If there is a developer who wants to explore innovative designs that increase their bottom line and build community values, we are here to work with them." One innovative part of the project is the use of a "phosphorous facilitator," a professional who works with developers and planners to encourage environmentally friendly projects.

These efforts have increased awareness of growth impacts on Cherry Creek and have brought people together to go beyond minimal regulations to protect water quality in the basin. These steps will make sure that Cherry Creek remains a vital resource as the Denver area continues to grow.

## Protecting groundwater

Groundwater is an increasingly important resource in Region 8, especially as a source of drinking water. Many activities, such as the use of fertilizers and pesticides in crop production, oil and gas development, chemical production and mining activities can cause pollution to leach through soils into the underlying water table. In some places, pollutants in groundwater can also become airborne and affect indoor air quality. Some of these pollutants can last a long time, a concern for both current and future drinking-water supplies.

One of the most important sources of groundwater pollution are the underground storage tanks used at gas stations, fuel storage facilities, chemical production and storage facilities and other businesses which can leak or rupture and contaminate groundwater. Common pollutants at these sites include volatile organic compounds such as benzene, ethylbenzene, xylene and toluene, as well as hazardous substances such as trichloroethylene and perchloroethylene.


*Tank removal on the Northern Cheyenne Reservation in Montana. EPA works with tribes to remove leaking and unsafe tanks and clean up soil and groundwater pollution. EPA's storage tank program has addressed nearly 500 sites in Indian Country.*

EPA's Underground Storage Tank program provides resources to states and tribes to remove leaking tanks and clean up polluted soils and groundwater. The program also establishes high standards for new tanks to make sure that they don't rupture or leak. To date, Region 8 and its partners have closed more than 66,000 substandard USTs and completed more than 14,000 cleanups at leaking UST sites. While cleanups continue, EPA is working to ensure that the Region's 23,000 active tanks meet requirements and are operated properly.

EPA is also using tank cleanup activities to achieve redevelopment goals. In Salt Lake City, an EPA UST fields pilot grant has helped the Utah Department of Environmental Quality assess contamination at the Citifront site and employ an innovative strategy using hydrogen peroxide injections to clean up the groundwater. The property now houses a four-story mixed residential and commercial building, including 155 apartment units.

Region 8 is also cleaning up several sites in Indian Country and working with stakeholders to encourage redevelopment. One of these, the Pryor Trading Post site on the Crow Reservation in Montana was cleaned up and determined as "ready for reuse" in October 2004. The tribe intends to redevelop this site into a much needed community center for youth and senior citizens and a grocery.

## Providing safe drinking water

Thousands of public and private drinking water supply systems, from large urban systems to those in isolated rural and tribal communities, deliver water to nearly 10 million people in Region 8

RESULTS IN FOCUS

## TMDLs: Flexible prescriptions for healthy lakes and rivers

One of the most important tools being used to revive polluted lakes and rivers are flexible plans called Total Maximum Daily Loads. TMDLs transform sick waters into healthy ones. In Region 8, they are addressing a wide range of problems in urban, suburban, mining and agricultural watersheds.

The TMDL process starts with states and tribes determining water quality standards for their lakes and rivers. EPA works closely with states and tribes in establishing standards that are protective of specific uses including drinking water, recreation, fisheries and agricultural uses. Once standards are set, states and authorized tribes monitor and report on water quality; those waters that are polluted are listed as impaired.

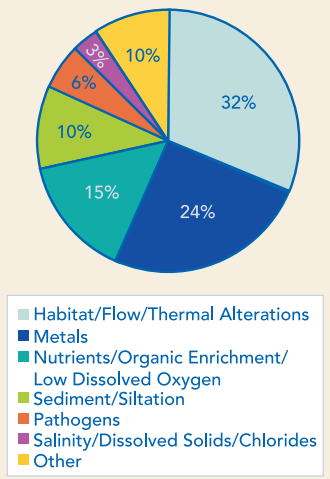
Under the Clean Water Act, EPA approves lists of impaired waters and TMDL plans submitted by states and authorized tribes. TMDLs are then implemented through existing regulatory and voluntary programs, many of which are described in this chapter. EPA Region 8's TMDL program emphasizes collaboration with local stakeholders. Since 1996, EPA has approved more than 1,300 TMDLs in Region 8, with another 1,700 expected by 2011.

### How does a TMDL work?

Imagine we have a river that is polluted with phosphorous, a nutrient that in excess can deprive water of oxygen and kill aquatic life. The first step in developing a TMDL is to look at sources of phosphorous along the river and estimate how much each is contributing. In this case, there are three sources: a wastewater treatment plant, a pulp mill and a cattle ranch. They respectively contribute 90, 60 and 30 pounds of phosphorous to the river daily, a total of 180 pounds.

We know that 180 pounds of phosphorous is giving us a polluted river, so the question becomes – how much do we need to reduce to get a clean river? This step requires some scientific analysis to assess the river's physical and chemical makeup to determine an amount the river can receive without exceeding the standard. In this case, it is determined that the river can receive 100 pounds daily — a total maximum daily load — without exceeding the standard. Since there are currently 180 pounds of phosphorous entering the river daily, we need to eliminate 80 pounds to reach the TMDL.

**Leading Causes of Water Quality Impairment in Region 8**




EPA: 2004

How do we get these reductions? The next step is to look at the pollution sources and allocate the TMDL of 100 pounds between them. In assigning allowable amounts from each source the TMDL can be flexibly designed to consider the cost and feasibility of reductions.

Let's say that the water treatment plant can most easily get reductions with a new treatment process that cuts phosphorous by 50 pounds a day. Now, only 30 pounds of reductions are needed from the mill and the ranch. If the pulp mill installs a new waste-recovery system that reduces pollution by 20 pounds, and the cattle ranch plants a vegetative buffer along the river that reduces loads by 10 pounds, the TMDL is complete.

As this simple example illustrates, a TMDL is a useful and flexible tool that provides a blueprint for source-by-source pollution reductions. Collectively, these reductions turn a polluted stream into a clean one.

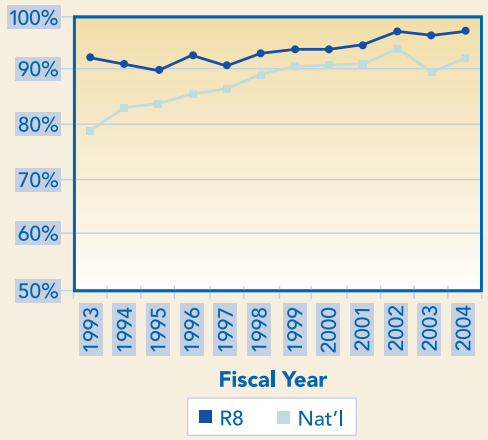
each day. EPA works closely with state, local and tribal governments to ensure that these drinking-water systems consistently meet all federal health-based standards. Region 8 is directly responsible for this task in the state of Wyoming and on tribal lands. For other states, we provide grants, loans, technical assistance and oversight to help states and water systems meet requirements associated with the Safe Drinking Water Act.

## Investing in drinking water through revolving loan funds

Providing safe drinking water is neither cheap, nor easy. Treating and monitoring water to make sure it is free of pathogens, chemicals, metals, organic pollutants and other substances that can harm human health require extensive infrastructure and technical skills. To help meet these needs, EPA provides money to states through the Drinking Water State Revolving Fund. States use this fund to implement their own drinking water programs and give loans to local governments to build, maintain and improve drinking water treatment plants and improve the quality of source water entering those plants.

Since 1997, the six Region 8 DWSRF programs have received more than $430 million in EPA grants. These funds support a variety of activities such as public water system supervision, source water protection, capacity development and operator certification. Through 2004, states have used these grants to provide more than $500 million to water systems to construct infrastructure and address drinking-water problems, including those related to meeting new health-based requirements established under the Safe Drinking Water Act, including the Surface

**Percent of Population Served by Community Water Systems in Region 8 that Meet All Health-Based Standards**




*Community water systems in Region 8 continue to invest in water treatment infrastructure and source water protection to ensure that drinking water meets all health-based standards and treatment requirements. Performance in Region 8 continues to improve.*

Water Treatment Rule, Interim Enhanced Surface Water Treatment Rule, Arsenic Rule and Disinfectants/Disinfection By-Products Rule.

## Delivering safe drinking water to rural communities and tribes in South Dakota

EPA is also helping rural communities and tribes secure access to safe drinking water. One ongoing effort is the massive Mni Wiconi project in South Dakota. Here, a 15-year-long project to build a network of treatment plants, water towers and pumps and thousands of miles of water distribution lines is beginning to deliver clean water from the Missouri River to thousands of people.

When complete, the project will include more than 4,000 miles of pipeline making it the largest distribution system in the United States. One major source of water for the project is a new surface water treatment plant located in Ft. Pierre.

In 2004, progress on Mni Wiconi Rural Water System continued. The project is now about 60 percent complete and when finished will serve about 50,000 people, including members of the Lower Brule Sioux Tribe, the Rosebud Sioux Tribe, the Oglala Sioux Tribe, and citizens in a number of rural, non-tribal communities.

EPA Region 8 has provided this huge project with resources and technical assistance including a dedicated engineer and regulatory specialist in a Pierre, South Dakota, field office. Today, as the system approaches completion, one of EPA's biggest roles is regulating the system which includes the treatment plant, core line and delivery systems, to make sure that safe drinking water rules and requirements such as monitoring and testing are met.

## PEOPLE IN ACTION

### Water quality partners in the Red River basin

The Red River, which flows northward into Canada and forms the border between North Dakota and Minnesota, has been a Region 8 priority for many years. Since 1995, EPA programs have invested nearly $5 million in grants and significant staff time to restore land and improve water quality in the largely agricultural basin. With EPA's help, basin interests have embraced a watershed approach and made great progress in involving citizens in efforts to solve water-quality and ecological problems.

*Bob Backman and Christine Holland of River Keepers host a tour of the Red River aboard the S.S. Ruby.*

EPA's success in the Red River has been achieved with help from a lot of friends. In 2004, Region 8 presented the "Friend of EPA" Award to Charles Fritz of the Red River Basin Institute, Genevieve Thompson of Greenway on the Red and Audubon Dakota, and Bob Backman and Christine Holland of River Keepers. The four were presented with the award for leading dozens of projects that are improving water quality in the basin. This includes efforts to create an interstate, multi-stakeholder plan to reduce pollution loads to the Red River, a volunteer chemical and biological monitoring program, and an agreement between local universities enabling cooperative work on natural resource issues.

The four were further praised for assisting EPA in a regional bio-assessment workshop and establishing an annual water festival which educates more than 1,400 students. In addition, the group received accolades for mapping wetlands and developing a plan to create a 600-mile greenway (of which 150 miles is already completed) along the river, and working closely with Canadian interests on international water-quality and treaty issues.

EPA's collaboration with local partners in the Red River basin demonstrates a growing ability to bring interests together to achieve locally defined environmental goals. "Without EPA's support many of the successful basin-wide initiatives would never have been undertaken," said Chuck Fritz.